

AIR FORCE FELLOWS

AIR UNIVERSITY

Living with the Devil: Stability in the 21st Century World With or Without Nuclear Weapons

by

Ryan S. Nye, Major, USAF

A Research Report Submitted to the Air Force Fellows
In Partial Fulfillment of the Graduation Requirements

Advisor:

Mr. Larry A. Schoof
Weapon Intern Program – Program Manager
Sandia National Laboratories

Maxwell Air Force Base, Alabama

March 2012

Report Documentation Page				Form Approved OMB No. 0704-0188	
Public reporting burden for the collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to a penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.					
1. REPORT DATE MAR 2012		2. REPORT TYPE		3. DATES COVERED 00-00-2012 to 00-00-2012	
4. TITLE AND SUBTITLE Living with the Devil: Stability in the 21st Century World With or Without Nuclear Weapons				5a. CONTRACT NUMBER	
				5b. GRANT NUMBER	
				5c. PROGRAM ELEMENT NUMBER	
6. AUTHOR(S)				5d. PROJECT NUMBER	
				5e. TASK NUMBER	
				5f. WORK UNIT NUMBER	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Air Force Fellows,Air University,Maxwell Air Force Base,AL,36112				8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)				10. SPONSOR/MONITOR'S ACRONYM(S)	
				11. SPONSOR/MONITOR'S REPORT NUMBER(S)	
12. DISTRIBUTION/AVAILABILITY STATEMENT Approved for public release; distribution unlimited					
13. SUPPLEMENTARY NOTES					
14. ABSTRACT The prevailing tone regarding nuclear weapons is that a world without nuclear weapons will be both safer and more stable. Yet, this latest push for eliminating nuclear weapons comes at a time when adversaries of the United States are actively pursuing nuclear technologies and enhancing their current stockpiles. The intent of this paper is to briefly review the history of weapons, their impact on warfare and to discuss whether or not the world would be safer with or without nuclear weapons.					
15. SUBJECT TERMS					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT Same as Report (SAR)	18. NUMBER OF PAGES 36	19a. NAME OF RESPONSIBLE PERSON
a. REPORT unclassified	b. ABSTRACT unclassified	c. THIS PAGE unclassified			

Disclaimer

The views expressed in this academic research paper are those of the author and do not reflect the official policy or position of the US government or the Department of Defense. In accordance with Air Force Instruction 51-303, it is not copyrighted, but is the property of the United States government.

Contents

	Page
DISCLAIMER	II
ABSTRACT	IV
INTRODUCTION	1
HISTORY OF WARFARE	3
NUCLEAR WEAPONS	11
THE WORLD IS SAFER WITH NUCLEAR WEAPONS	13
THE WORLD IS SAFER WITHOUT NUCLEAR WEAPONS	20
THE FUTURE	24
CONCLUSION	28

Abstract

The prevailing tone regarding nuclear weapons is that a world without nuclear weapons will be both safer and more stable. Yet, this latest push for eliminating nuclear weapons comes at a time when adversaries of the United States are actively pursuing nuclear technologies and enhancing their current stockpiles. The intent of this paper is to briefly review the history of weapons, their impact on warfare and to discuss whether or not the world would be safer with or without nuclear weapons.

The technology required to create nuclear weapons is widespread and therefore will always exist. Nuclear weapons will continue to play a major role in politics, military strategy and security even if the current nuclear powers are able to reduce or eliminate their own nuclear arsenals. If the world continues to push towards a nuclear zero, we are disregarding historical lessons and eliminating our most powerful deterrent capability. We have already halted progress and innovation within our own nuclear enterprise and - in this author's opinion - if we are not progressing, we must be falling behind.

While an arms race is not desired, a strong and unwavering approach towards non-proliferation policy, compliance and restrictions combined with a modern and effective nuclear arsenal will provide our country with a degree of safety and stability not yet known. For this to occur, we must first overcome the fear of all things nuclear and not immediately discard its proven potential for establishing peace and preventing war.

Chapter 1

Introduction

The ordinary man is much more likely to do the right thing if he really understands why he is doing it, and what will probably happen if he does something else; and the best basis for sound judgment is a knowledge of what has been done in the past, and with what results.

- J.C. Slessor

The term “Cold War” and the associated nation-wide belief that at any moment we may hear the penetrating whine of a siren alerting us to the initiation of World War III and imminent destruction is quickly dissipating into the past. The survivors of this nuclear stand-off between superpowers are growing older and leaving this earthly existence. The memories of school drills, public information messages on survival techniques and images of nuclear testing are becoming artifacts of a time long past. However, from September 2, 1945 to December 26, 1991 the life of the average United States citizen was intimately and unavoidably bound to a belief in the battle of “Good vs. Evil.”

It seems almost surreal that we lived through such uncertain times and it is difficult to imagine how this generation, with their “riot for hire” and “me first” mentality, would respond to a 46 year conflict with such high stakes. I believe we have forgotten that solidarity and a will to fight for the greater good at all costs is what sustained this great nation and gave us the strength to survive and win the greatest and most dangerous of all conflicts. During the Cold War, we demonstrated a will to support the technology required to prevent our enemy from gaining an advantage and left no doubt that we could and would respond with immediate and unrelenting destruction on the adversary.

Today, the public mindset has changed. Many people want to throw down our greatest weapon and simply ask the adversary to respect our decision and - if they would not mind - stop

building their own nuclear weapons or if they already have them, destroy them and promise never to again seek out the technology.

Throughout history, this has been proven to fail; conflict is inevitable and it is human nature to desire the most powerful weapons, to exploit the weak for valuable resources and to impose one's own belief system. Only when we are all determined to live a higher law with a belief in freedom, compassion and tolerance can we approach peace and tranquility. The problem is this belief in a higher law is not shared by all inhabitants of the earth and if human history is any indicator, it never will.

In 2009, President Obama spoke in Prague, Czech Republic and expressed his desires for the future of nuclear weapons in the 21st Century. In discussing this topic, he indicated a desire for a world without nuclear weapons and laid out a plan for accomplishing this monumental feat. The first step in his plan indicates that our current policies are based on Cold War strategies and must be changed. He said, “To put an end to Cold War thinking, we will reduce the role of nuclear weapons in our national security strategy, and urge others to do the same.”¹ It will obviously be more complicated than simply urging others to follow our lead in an environment where “the threat of global nuclear war has gone down, but the risk of nuclear attack has gone up.”²

This paper will address the feasibility of seeking a world without nuclear weapons. First, I will provide a historical perspective on conflicts and what lessons we have learned - or should have learned. I will then give a brief description of a nuclear weapon. Then, I will also discuss two differing opinions: The world is a safer place **with** nuclear weapons and the world is a safer place **without** nuclear weapons. Finally, I will address future issues and concerns if we stay on the current trajectory.

Chapter 2

History of Warfare

It is only one who is thoroughly acquainted with the evils of war that can thoroughly understand the profitable way of carrying it on.

-Sun Tzu

Understanding the history of warfare prior to nuclear weapons is an important element when discussing the current stance on nuclear weapons and our current strategies. The purpose or cause for war has changed very little over time, but the tools of war have rapidly evolved with modern technologies. It is a constant battle between weapon design, strategy development and defense capability. In any conflict, sound strategy and tactics must be developed in order to employ new weapons that are effective on the desired targets. Subsequently, the defense of the target is adapted to mitigate the effect of each new weapon and so on and so forth. I do not intend to discuss the entire history of war and weaponry so I will focus on some prominent events leading to what is considered modern warfare. First, I will attempt to provide some insight into the flow of major technological advances in weaponry. I will conclude with a snapshot on the duration and lethality of major wars.

Technological Advances

The Hundred Years war between the English and the French was the origin of many new tactics and weapons. Of particular note is the English Longbow. Prior to this time, all combat was hand-to-hand or occurred at least within an arms throw. The longbow allowed the English to attack or defend from greater distances, thus limiting their casualties, disrupting the adversaries' strategy and equalizing the battlefield for the English even when they were placed at a numerical disadvantage.

The Battle of Crecy in 1346 as described by eHistory@The Ohio State University:

“Crécy was one of history's most decisive battles. After the battle of Sluys, Edward III landed in Normandy in July 1346 with about 10,000 men. The French pursued. Edward III decided to halt near Crecy in Normandy and to prepare for battle the next day. However, the French vanguard made contact and started to attack without the benefit of a plan. The French made as many as 15 attacks and the English checked each one in turn mainly because of the English longbowmen. At the end, the French were decimated and the English had a decisive victory.”³

The Battle of Agincourt in 1415 as described by eHistory@The Ohio State University:

“After the successful siege at Harfleur, Henry marched his force of about 6000 knights, archers and men-at-arms towards Calais. During his march the French army of 20,000 was able to position itself between Henry and Calais. Henry used a narrow front channeled by woodland to give his heavily outnumbered force a chance. The French deployed in three lines. The first line attacked and was repulsed by the English longbowmen. The second line attacked and was beaten back. The third line moved to engage but loss [sic] heart when they crossed the field covered with French dead; they soon retreated. Henry was left with control of the battlefield and a decisive victory.”⁴

The preceding descriptions showed that the English prevailed through the use of better technology and strategy even being outnumbered at times by more than 3 to 1. The longbow offered relatively long-range strike capability and a lethality far superior to other weapons of the day.

In addition to the longbow, the development and use of gunpowder quickly changed the face of warfare during the Hundred Years War. A primitive cannon was able to destroy castle walls from a relatively safe distance. Previously, these walls would have to be scaled by soldiers

and no doubt the loss of life during these attempts was great since a soldier can either climb or fight but not both and those on top of the wall held the critical “high ground” on the battlefield.⁵

By the 17th Century, improved cannons, muskets and primitive hand grenades were developed. Lighter weight rifles and artillery with increased range and firepower began to change the landscape of war. A man by the name of Gustavus Adolphus began to produce more combat capable cannons, rifles and shot. He developed the millimeter caliber measurement that we use today to reference the size of ammunition a particular weapon will fire.⁶ Adolphus developed procedures to enhance the efficiency and effectiveness of his artillery gunners to the point where his gunners “could fire eight rounds from a single gun in the time it took a musketeer with a firelock to fire a single round.”⁷

Richard Gabriel and Karen Metz described how advances in technology continued to lead to the development of weapons that were more lethal and more accurate at longer distances. Inventions such as timing fuzes allowed armies to explode rounds over the top of the enemy, greatly increasing the lethality of artillery. In addition, the use of rifling in barrels and cone shaped, one-piece ammunition increased accuracy, speed and usability of weapons in any environment.⁸ They said, “During the Civil War a rifled musket could easily kill at 1,000 yards and was deadly accurate at 600 yards.”⁹

By the end of the civil war, an even deadlier weapon was created - the “machine gun.” The Gatling Gun was the first of its kind. It had multiple barrels that functioned by rotating a handle that placed each barrel into position and fired as it spun around. “The Gatling Gun was capable of a sustained rate of fire of 100 rounds a minute, almost equal to the rate of fire from 40 infantrymen. By 1900, Hiram Maxim, an American, invented a truly modern machine gun capable of a sustained rate of fire of 600 rounds a minute.”¹⁰

Alfred Nobel, the namesake of the Nobel Peace Prize, and his father played a large role in the development of modern weaponry in the late 1800's. According to Nobelprize.org, Immanuel Nobel developed the first underwater mines capable of destroying naval vessels and Alfred Nobel invented dynamite and smokeless powder, both of which are still in use today. He also designed rockets, cannons and progressive powder. It is said that Alfred wanted to "produce material or a machine which would have such a devastating effect that war from then on, would be impossible."¹¹ In 1891, Nobel said "perhaps my factories will put an end to war sooner than your congresses: on the day that two army corps can mutually annihilate each other in a second, all civilised nations will surely recoil with horror and disband their troops."¹²

In the 1880's, artillery was able to reach long distances and strike hard cement and steel targets with destructive power. "The Krupp siege cannon, "Big Bertha," could raise an 1800 pound shell 3 miles into the air and hit a target at very high velocity 10 thousand yards away."¹³

Delivery platforms also improved alongside the weapons. Submarines were developed in the early 1900's. According to Gabriel and Metz, "by 1914, the six major naval powers of the world put 249 submarines to sea."¹⁴ This allowed for a type of "stealth" and a capability to destroy even the greatest of enemy ships without having to withstand a face-to-face attack.

During the same time, the airplane also began to take hold. Orville Wright flew in 1903 but the military did not initially exploit the potential that we see today in dominating the air domain. It did not take long however to recognize the impact that a properly armed airplane could have on a battlefield. "The Russians introduced the world's first heavy bomber, the *Sikorsky Bolshoi*, with a wingspan of over 90 feet. During the Turko-Italian War (1911-12) in Libya the world witnessed the first military use of the airplane in war. The Italians first

employed the airplane for artillery observation, and were the first to introduce aerial photography. Italian pilots were the first to drop bombs against an enemy force in combat.”¹⁵

Land based platforms also developed. By 1917-1918, the battle tank proved to be an effective mobile, armored platform capable of firing large ammunition in all directions. The ability to move heavy ammunition relatively quickly around the battlefield proved deadly to unarmored enemy formations.¹⁶

As you would imagine, with each step up in weapons and weapon systems engineering there was another technology being designed to defeat it. The bazooka countered tanks, depth charges countered submarines and anti-aircraft guns capable of firing large caliber rounds miles into the sky quickly developed. Aircraft of all types were specialized and armed with weapons to fulfill a variety of functions such as close air support of ground troops, air to air combat, destroying armored vehicles and penetrating hardened bunkers. The goals were based on the concept of further, faster, more powerful and more accurate. The idea was to defeat the enemy with your technology before they could defeat you. “In 1980 the U.S. Army estimated that modern non-nuclear conventional war had become 400 to 700 percent more lethal and intense as it had been in World War II depending, of course, on the battle scenario. The increases in conventional killing power have been enormous, and far greater and more rapid than in any other period in man's history.”¹⁷ The capability of today's military is significant when you do not even have to place a boot on the battlefield to make a decisive strike. We can fly aircraft (manned and unmanned) that are nearly undetectable on radar from the comfort of their home station to the battlefield, make a precision strike and return home without landing. We can accurately fire guided missiles from ships sitting comfortably at sea miles from the target.

In summary, warfare has developed from simple hand-to-hand combat with a fist, wooden club, or sword to ever increasing stand-off distances as allowed by longbows, muskets, rifles, artillery and guided missiles. These developments have changed the strategies of war and increased the lethality of conflict. Technology has given us the ability to fight day or night, in any weather conditions and with nearly the same crushing lethality.

This paper will not address the impact of intelligence, surveillance and reconnaissance on the lethality of warfare but their impact is undeniable. The ability to hit “unseen” targets from miles or even continents away, to select targets and assess battle damage with near real-time or even real-time imagery, to communicate around the globe with encrypted data and voice links are force enhancers that give warfighters a distinct advantage on any battlefield.

Generations of warfighters from the beginning of time learned, adapted and taught the basic principles of war. They embraced technology and the invention of more lethal and effective tools of war. They used them to their advantage in numerous conflicts and learned to adjust strategy according to their weapons’ capability. It does not matter if one plans to use warfighting capability in a defensive, hostile or deterrent posture; the use of the most recent and effective means and ways to accomplish the end has and should always be the goal. History has shown that weapons of war remained in effect until another was introduced and was proven to be more lethal and more effective at meeting the objective.

Duration and Casualties of Major Wars

There is no simple calculation or formula to relate weapon advancement to casualty statistics or duration of wars. There are too many variables and extenuating circumstances. However, when you simply look at them with a world-view perspective you will begin to see relationships between technology, duration and lethality.

In Europe, two World Wars were fought in a span of 30 years prior to the development of the nuclear weapon and none since. In fact, in the 1990s the European Union (EU) united many countries economically and politically. Now, 27 member states of the EU travel and trade freely using a single currency. They work together on environmental policies, economic development, the advancement of human rights, and the promotion of democracy.¹⁸

“World War I took the life of more than 9 million soldiers; 21 million more were wounded. Civilian casualties caused indirectly by the war numbered close to 10 million. The two nations most affected were Germany and France, each of which sent some 80 percent of their male populations between the ages of 15 and 49 into battle.”¹⁹ The end of WWI and the resultant political and economic instability led to the rise of Nazi Germany and WWII widely recognized as the most devastating war in history.²⁰

The actual death toll will never be known but WWII took the lives of some 35-60 million people, not to mention the death of 6 million Jews who were not combatants. As is well documented, the bombing of Hiroshima and Nagasaki with Little Boy and Fat Man ended WWII rather decisively.²¹

In the years since the development of nuclear technology, there have been obvious changes in historically combative adversaries and a new type of war between superpowers.

WWII gave rise to two superpowers: The United States (US) and the Union of Soviet Socialist Republics (USSR), who engaged in what has been termed the Cold War. This interaction was unique in that it was a 46 year war with zero battlefield casualties and zero destruction of enemy infrastructure. This is not to say there weren't any costs incurred during the Cold War. The strategic arms race that ensued was very expensive, shaped cultures and

cultivated fear. This was a war of finances, politics and technological advancement that the US won by out-maneuvering, out-spending and outlasting the USSR.

According to BBC News, Pakistan and India fought major wars over borders and religious beliefs starting in 1947 when they were partitioned into India and Pakistan. The last major war between the two countries was fought in 1971. Even today there is great tension over the Jammu and Kashmir region and religious beliefs. However, these tensions and potential outbreak of major wars appear to have been tempered by the acquisition of nuclear weapon technology. India detonated its first nuclear device in 1974 and Pakistan announced the test firing of a long range missile in 1989. However, it wasn't until the 1990's that they both began to seriously develop nuclear weapons capability. Since 1971, there have been a few skirmishes and small conflicts arise but all-out war has been averted. It could be argued that the fear of a nuclear exchange has helped contain these small conflicts and keep them from progressing into a larger war.²²

We currently face a Global War on Terror or what is now called an Overseas Contingency Operation. This might not be considered a major war but it may be the prototype of future conflicts. Our list of enemies has definitely changed since the Cold War and the battlefield is dynamic. The threats to our freedom come from a variety of sources and cultural backgrounds. The duration and outcome of this war is yet to be written but whether we like it or not nuclear weapons and nuclear proliferation play a significant role.

Chapter 3

Nuclear Weapons

So much damage from such a little thing.

- Slobodan Milosevic

Never has there been a more efficient and effective explosive weapon than a nuclear weapon. The impact of the nuclear weapon is not only defined in war but also in politics. In fact, the Department of Defense (DOD) established a policy that “nuclear weapon systems shall require special consideration because of their political and military importance, their destructive power, and the potential consequences of an accident or unauthorized act.”²³

In general, an explosive weapon is an explosive weapon regardless of its mechanism. The destructive power is derived from the rapid release of energy. According to *The Effects of Nuclear Weapons*, the release of energy causes dramatic increases in temperature and pressure converting all the associated materials into hot compressed gases. These gases expand outward creating a shockwave with destructive power. The difference between conventional and nuclear weapons lies in the origin of the power and the products. There are four main differences. First, a nuclear weapon may be thousands or millions of times more powerful than any conventional high explosive. Second, the mass of material required to achieve a certain yield in a nuclear blast is significantly less than a conventional weapon. Third, the temperatures in a nuclear explosion far exceed conventional detonations. The nuclear thermal energy is transmitted as both light and heat. This thermal energy is capable of causing skin burns and starting fires. Finally, the nuclear explosion will produce a variety of radiation phenomena such as invisible rays and/or physical substances.²⁴ Therefore, the core difference between conventional and nuclear weapons is in capability and deterrent value. Nuclear weapons are much more efficient

and much more powerful but by design they are still a weapon and have the same ultimate function ... to kill people and break things.

Chapter 4

The World is Safer WITH Nuclear Weapons

Hence to fight and conquer in all your battles is not supreme excellence; supreme excellence consists in breaking the enemy's resistance without fighting.

- Sun Tzu

The utopia promised by advocates of a world without nuclear weapons is difficult to understand and even harder to justify. With a look back into a not so distant time, one will find a world without nuclear weapons ... and it was not peaceful, stable nor safe. Many opponents of nuclear weapons say the casualties and collateral damage associated with nuclear weapons are simply too great. Others argue that the nuclear weapon is no longer needed and serves no purpose because the Cold War is over. There is obviously a widespread misunderstanding of the importance and capability of nuclear weapons in preserving peace and encouraging the establishment of mutual agreements among countries with different values and goals.

The current role nuclear weapons serve in the safety and stability of the world is clearly discussed in many venues and in a variety of documents. In particular, the Nuclear Posture Review (NPR) states, "Indeed, as long as nuclear weapons exist, the United States will maintain safe, secure, and effective nuclear forces... These nuclear forces will continue to play an essential role in deterring potential adversaries, reassuring allies and partners around the world, and promoting stability globally and in key regions."²⁵

There are many who wish the nuclear weapon had never been invented. They believe that the world would be safer without this technology. From a historical perspective, it is clear that the nuclear age of warfare has proven to be less lethal and more stable than previous ages. The devastation and death toll of WWI and WWII are nearly beyond comprehension and far exceed any combination of wars and conflicts since the bombing of Hiroshima and Nagasaki in

August 1945. If you were a male between the ages of 15 and 49 in Germany or France, which time-period would you rather live in, pre-1945 or post-1945?

The main purpose of nuclear weapons is to deter war. The Cold War was a time of great fear and massive build-up of nuclear arsenals to ensure the enemy would know that mutual destruction was assured. The absolute power of these weapons prevented scores of deaths and deterred costly battles. Instead of catastrophic battles, effort was given towards a variety of agreements, treaties and discussions on how to coexist. Thus, nuclear weapons actually made our world safer during the Cold War. Since the Cold War, other countries have recognized the importance of nuclear power and realized that the negotiating power of a country with nuclear weapons is much greater than one without.

Even if all the current nuclear states eliminated their weapons, the technology is known and would undoubtedly be revived due to the awesome power it projects. It is believed that “the knowledge needed to create the power and destructive potential of nuclear weapons is widespread and is a continuing fact of life.”²⁶ To my knowledge, there has never been a weapon or any other technology that was “un-invented” to the point that it ceased to exist or was not used in other ventures. From a historical perspective, militaries have always desired the best, most advanced weapons available.

It has been said that the argument for keeping nuclear weapons because they will never be “un-invented” is a null argument because according to George Perkovich and James Acton, “Civilization has nevertheless prohibited and dismantled artefacts [sic] deemed too dangerous, damaging or morally objectionable to continue living with.”²⁷ In one example, a comparison with nuclear weapons was drawn to the world-wide success in eliminating mass-scale gas chambers. The example indicated that “Mass-scale gas chambers such as those used by Nazi

Germany have not been disinvented, [sic] but they are not tolerated.”²⁸ An additional comparison made a similar claim saying, “The CFCs (chlorofluorocarbons) that created a hole in the ozone layer cannot be disinvented, [sic] but they have been prohibited with great benefit and other means have been found to perform their functions.”²⁹ It is difficult to see a relationship between a nuclear weapon and a non-weapon such as these when it comes to an adversaries’ desire to acquire the technology or refuse to abide by non-proliferation restrictions. A nuclear weapon can be delivered with precision anywhere around the globe. A gas chamber is not an employable weapon that can be used as a form of combat. Only after capture and transportation to the facility would the victim experience its effect. CFCs may be dangerous to the ozone but nobody loads up artillery shells with CFCs and launches them at an enemy to win a war. Therefore, the desirability level between a nuclear weapon and any other weapon and especially a non-weapon is drastically different.

If we do compare weapons and non-weapons, where do we draw the line on prohibiting things that are just “too dangerous” for this world? What about passenger vehicles of all types? Should we prohibit and not tolerate them? Not only do vehicles pollute much like CFCs but according to the World Health Organization, they kill over 1.2 million people every year and that number is only expected to rise.³⁰ Why is it acceptable to kill millions of people in smaller groups over longer periods of time with a technology (motorized vehicles) that is not even designed with the intent to deter a conflict, kill people or break things? Is it because they are not designed as a weapon that we accept them? Should we only prohibit and not tolerate technology that is designed and labeled as a weapon? If this is true, which weapons should we prohibit? Nuclear weapons have probably killed fewer people than any other weapon in the history of

weapons...from the club to the automatic rifle or any single type of conventional explosive from grenades to bombs and missiles.

The nuclear weapon should not be compared to a non-weapon such as the gas chamber or CFCs or any other conventional weapon when contemplating a plan for non-tolerance and abolition. The power of a nuclear weapon is unique and will forever attract the attention of those who desire power, influence and security thus making prohibition nearly impossible to enforce.

A world without nuclear weapons will be a world where we are constantly monitoring and living in fear of a clandestine state or non-rational group acquiring the technology. Where there is a will, there is a way. People will find a way to bypass the rules and develop this great technology without detection. The fear and suspicion of our adversaries and the requirement for constant monitoring would create an even more unstable and unsafe world.

The key to a safety in a world with nuclear weapons is to stop fearing the technology. We must embrace the tools we have developed and make our weapons even more reliable, more precise and safer from terrorism, accidents and theft. The Nuclear Posture Review (NPR) Report published in 2010 emphatically restricts the development of new nuclear warheads and the need for testing. The NPR says, "...we can ensure a safe, secure, and effective deterrent without the development of new nuclear warheads or further testing."³¹ How can we fully "put an end to Cold War thinking" when the nuclear enterprise is restricted to Cold War relics in our stockpile and testing? Changes to policies and force posture only go so far to assure our allies that they do not need nuclear weapons. How far into the future can we keep our stockpile relevant without significant overhaul? Yes, the current stockpile is safe and reliable but we continue to try and make a Cold War design fit 21st Century threats. This is comparable to retrofitting a B-17 "Flying Fortress" into a long range stealth bomber and being satisfied with the outcome. We

could probably make it work to a certain extent, but it will never be the B-2 bomber or fulfill its required capabilities.

The NPR placed preventing nuclear proliferation and nuclear terrorism at the top of the U.S. nuclear agenda. Our adversaries know they cannot match our conventional firepower and they are turning to nuclear technology as the ultimate equalizer. Given the authority and direction, the Nuclear Security Enterprise (NSE) could design and employ nuclear weapons that are specific to the current threats and could deliver a similar deterrent impact as the nuclear weapons of the Cold War. Deterrence is the ultimate goal, isn't it?

In the Cold War, our nuclear arsenal deterred the Soviet nuclear arsenal because we had the right size, fit, function and strategy for the threat. Today, is it beyond comprehension that we will deter not only nuclear-armed states but also terrorist organizations, terrorist supporters and others who would jeopardize our safety and the safety of our allies more effectively if we right-size our nuclear arsenal and develop new weapons that fit current threats? Our conventional forces are more than competent and far superior to most but they still do not globally project the deterrent power of a nuclear weapon. Some feel that this will just increase the probability of using a nuclear weapon. The Defense Science Board (DSB) report provided this insight: "Some have expressed the view that tailoring the nuclear weapons stockpile, over time, to make its deterrent power more credible lowers the nuclear threshold increasing the probability that nuclear weapons will be used. The opposite is far more likely. That is, the more credible their use in the face of extreme provocation, the more powerful their deterrent effect, and the less likely their employment will be needed."³² We must assume that any enemy will weigh the benefits versus the costs of war. When facing a conventional attack, the adversary may deduce that it is possible to survive an all-out attack and would therefore be able to employ a counter-

attack that would achieve some goal. When facing a nuclear attack that was specifically designed for a certain type or location of target, it would be difficult for the adversary to believe they could survive. Thus, the cost would outweigh the benefit and conflict would be deterred. Remember, when conflict is deterred...there are no battle casualties.

Only our adversaries can determine the relevance of our deterrent efforts. According to the DSB report, “weapons that are not seen as useable and effective by potential adversaries cannot be an effective, reliable deterrent.”³³ Each adversary must be addressed and a weapon designed specifically to deter and if needed defeat that specific threat.

We are facing new nuclear challenges in the 21st Century, but by not considering or adapting a proven weapon technology to these new threats we place our continuing freedom at risk. All of our adversaries, whether they be state or non-state actors require resources and some type of infrastructure to function. We have attempted to hold these value targets at risk with political, economic and conventional weapon strategy. The adversary has found loopholes in our strategy and is working to mitigate our strength. They are working covertly in the acquisition of nuclear technology and materials; they are burying facilities beyond our conventional capabilities. In an interview, Defense Secretary Leon Panetta acknowledged that even the new 30,000 pound bomb designed specifically for underground targets was not yet ready to hold targets like Iran’s deeply buried nuclear facilities at risk. The next option would have to be of the nuclear variety.³⁴ Without capable nuclear weapon options, what would deter our adversaries from following Iran’s example and building their own nuclear facilities outside the reach of conventional weapons? Would it not be a safer world if we created a more efficient and effective nuclear deterrent for the changing threat? As Francis Bacon said, “He that will not apply new remedies must expect new evils; for time is the greatest innovator.”³⁵

A World War was ended and the country was once again considered safer as a direct result of the awesome power of nuclear weapons. Since that time, we have not had to employ a nuclear weapon in war because of the deterrent effect. Nuclear weapons preserved freedom in the 20th Century. If we desire to live in a world where we can enjoy the same freedoms in the 21st Century, we must develop an effective nuclear strategy with strong policy and partnership with our allies and a stockpile capable of handling continually evolving threats.

Chapter 5

The World is Safer WITHOUT Nuclear Weapons

The gravest danger our nation faces lies at the crossroads of radicalism and technology. Our enemies have openly declared that they are seeking weapons of mass destruction, and evidence indicates they are doing so with determination.

- President George W. Bush

The Manhattan Project designed, built and detonated the first nuclear device on July 16th 1945 in what is known as the Trinity test. Upon seeing the blast, Robert Oppenheimer stated, “Now I am become death, the destroyer of worlds.”³⁶ According to Charles Loeber, four hours after the Trinity test, the bomb known as “Little Boy” was enroute to its forward deployed location in preparation for employment and “Fat Man” soon followed. On August 6th and 9th of the same year, both bombs were detonated over Japan. Hundreds of thousands of lives were lost; hundreds of thousands more were seriously injured or sickened.³⁷ The most basic nuclear designs were employed with only limited testing yet they still resulted in major casualties. Now we have refined the designs and have had years of testing and modeling to improve efficiency and effectiveness. What would Oppenheimer say about today’s weapon capability or the inventories around the world?

It could be argued that nuclear weapons were required to end WWII because we did not have the conventional forces necessary to end the war. It could also be argued that we needed our nuclear forces to deter an opposing nuclear threat from the Soviet Union. The Cold War has been over for about 20 years and our conventional forces are currently second to none. We are capable of performing a conventional warfighting mission anywhere in the world. So what is the purpose of our nuclear arsenal? One point of view is that nuclear weapons serve one purpose, to deter others’ nuclear weapons. President Obama stated that “the threat of global nuclear war has gone down, but the risk of nuclear attack has gone up.”³⁸ What this means is we are not in

immediate danger of attack by a major nuclear power. Instead, we should be concerned with non-state actors acquiring nuclear materials and using them in a tactical nature on the U.S. or our allies.

It is clear that we have a greater chance of maintaining our freedoms at home and abroad if we can remove the possibility of our adversaries acquiring a nuclear weapon that is capable of killing an entire city in one single act of violence.

George Perkovich and James Acton provided five reasons the world would be safer without nuclear weapons. First, they indicate that nuclear states must fully support the Nuclear Non-proliferation Treaty (NPT) and work towards elimination of their nuclear weapons. Otherwise, “the alternative is a breakdown of nuclear order and a more precarious effort to manage it through competition and perhaps warfare.”³⁹ Second, “The expansion of nuclear energy will threaten security if it is not paired with the universal adoption of tougher verification and inspection protocols and other instruments, such as new rules for managing the nuclear fuel-cycle.”⁴⁰ Third, “Preventing nuclear terrorism is another major reason to pursue the measures to securely and verifiably eliminate nuclear arsenals and enforceably [sic] bar proliferation.”⁴¹ Fourth, “The failure of the nuclear-armed states to eliminate their nuclear arsenals is likely to tempt others to seek their own such weapons in coming decades.”⁴² Fifth, “The ultimate reason for trying to eliminate nuclear arsenals is to reduce the danger of sudden mass annihilation that nuclear weapons are uniquely capable of producing.”⁴³

There have been many opinions on what it will take to make a world without nuclear weapons a reality. One of the most compelling is from an article titled “The Logic of Zero” that reads,

Setting a vision of this kind is vitally important, but it is not enough. What is also needed is a strategic logic that explains how

the world can get there from here. It involves four major steps, each difficult but feasible. First, Washington must establish as official policy the limited purpose of U.S. nuclear forces: to prevent the use of nuclear weapons by others. Other purposes are no longer realistic or necessary for the United States. Second, given this limited purpose of its nuclear weapons, the United States should reduce its nuclear arsenal to no more than 1,000 total weapons. This would be more than enough to convince anyone that the United States possesses the capacity to respond to any use of nuclear weapons with devastating effect. Third, the United States must work to put in place a comprehensive international nuclear-control regime that goes well beyond the present nonproliferation regime's accounting and monitoring of nuclear materials. It must include all fissile materials and provide an airtight verification system to enable the world to move from thousands of nuclear weapons to hundreds, to tens, and ultimately to zero.

Finally, Washington must launch a vigorous diplomatic effort to convince the world of the logic of zero - and of the benefits of taking the difficult steps necessary to get there. This effort should start with its closest and most important allies, then include other nonnuclear states who have long called for such an initiative, and ultimately encompass all nuclear states. U.S. leadership of this international effort will be crucial. And a willingness to act boldly to reduce its own reliance on nuclear weapons and drastically cut its own arsenal can give Washington the credibility necessary to succeed.⁴⁴

President Obama provided similar steps to nuclear zero and was emphatic that it is possible; if we are committed. In summary, his plan is to reduce the role of nuclear weapons in the national security strategy, reduce the stockpile, ratify the Comprehensive Test Ban Treaty, seek a new treaty to end production of fissile material, strengthen the Nuclear Non-Proliferation Treaty and establish an international nuclear fuel bank. He indicates that the overarching success of this plan lies in the ability of the world to enforce restrictions, hold violators accountable and achieve unhindered inspection access.⁴⁵

In a world without nuclear weapons, the U.S. can focus on enhancing its already powerful and capable conventional forces in the defense of freedom. A majority of nations must

commit to a nuclear zero philosophy and dedicate sufficient resources and support to the continued monitoring and restriction against the resurrection of nuclear technology. Having such a collaborative effort among nations will strengthen bonds and develop cooperative relationships that will promote peace to a level never before experienced in the modern world. In order for this to work, we must follow President Obama's guidance: "Rules must be binding. Violations must be punished. Words must mean something."⁴⁶

Chapter 6

The Future

So long as there is a finite chance of war, we have to be interested in outcomes; and although all outcomes would be bad, some would be very much worse than others.

- Bernard Brodie

Our current and most obvious enemy (terrorism) does not fear personal death or the death of civilians and is hiding in population centers. This is similar to the enemy (the Japanese) we faced during WWII. During both of the World Wars, we accepted the fact that there would be civilian casualties and devastation to the enemy's industry and way of life. Now, we seem unwilling to consider all options available to win a war or even better to deter a war. We proved it in Vietnam and Korea...when you fail to use all of your resources and accept the consequences of victory...you place more people in harm's way for extended periods of time and the end result is probably the same if not worse. Death is a consequence of war and it appears that the current moral tolerance level is clear; avoid killing a bunch of people at one time with our most powerful weapon. What we do instead is kill a few people at a time with highly technical conventional weapons and highly skilled military personnel and we destroy specific structures or industries in a given place, one at a time. Our desire is to limit collateral damage and this is an awesome accomplishment, but it drags out the conflict. Sun Tzu once said, "There is no instance of a country having benefited from prolonged warfare."⁴⁷ What if we could avoid the conflict all together or if deterrence fails execute an attack that is overwhelming and immediate without placing more of our own men and women in harm's way? We seem willing to continue to lose our own warfighters in small scale battles and potentially abort a critical mission if there will be any civilian casualties. Our adversaries are able to use this mindset to their advantage. We more easily accept our own casualties and are expected to feel comforted that they died in the service

of their country and the fight for freedom. Is it morally responsible to sacrifice our own when we may have the capability to design a weapon that could end the war more quickly and effectively and not place our own warriors in harm's way as frequently? It is true that our current stockpile may not meet many of the current requirements for small scale battles or special targets but it is only because we will not allow them to be designed or modified to meet those new requirements.

If we are successful in eliminating nuclear weapons and establishing a firm non-proliferation stance, how effective will we be in urging others to follow our lead?

According to the Arms Control Association, in September 2007 Israel destroyed a covert Syrian nuclear facility that was a combined effort with North Korea.⁴⁸ According to an Op-Ed in the Wall Street Journal, Syria was a party to the NPT "yet Syria was able to secretly buy a nuclear reactor from North Korea, a country facing the most restrictive sanctions regime in the world. If Israel had not bombed the Al-Kibar reactor site in an air strike in September 2007, it would be producing plutonium by now for Syria's first nuclear bomb."⁴⁹ This is proof that the international community will have a difficult time monitoring and enforcing restrictions on those who simply choose not to comply regardless of outward agreements and treaties.

Foxnews reported, in February 2012, that Israel is considering a military strike on Iranian nuclear facilities out of the fear they are enriching uranium for a nuclear weapon. The report also provided a look back at some major events regarding Iran. The report listed the following points of interest:

1. Iran was designated as a State Sponsor of Terrorism in 1984.
2. In 2010 the US State Department said that Iran remained the most active sponsor of terrorism.
3. Iran has ignored five United Nations resolutions to freeze their enrichment programs.⁵⁰

Iran is a prime example of how difficult it will be to establish international restriction, prohibition and monitoring of nuclear facilities when the perpetrator does not wish to comply. This failure to stop nuclear proliferation clearly proves a view found in the DSB report. The report said, “It would be enormously self-centered to believe that the U.S. influence as a role model is more powerful than a foreign leadership’s own conclusions about its national interests and the value of WMD.”⁵¹ As much as we may want to believe that we can simply set the example and prohibit or outlaw nuclear weapons, it is practically impossible to enforce non-proliferation by only using political, economic and social means. In this case, it is apparent that words are not enough. The President in his speech in Prague said, “Some argue that the spread of these weapons cannot be stopped, cannot be checked - that we are destined to live in a world where more nations and more people possess the ultimate tools of destruction. Such fatalism is a deadly adversary, for if we believe that the spread of nuclear weapons is inevitable, then in some way we are admitting to ourselves that the use of nuclear weapons is inevitable.”⁵² He goes on to say, “But we go forward with no illusions. Some countries will break the rules.”⁵³ It appears that as much as we want to stop the spread of nuclear weapons, we must accept the fact that some adversaries will not stop until they have achieved nuclear status. In fact, one could argue that our superior conventional force is what drives our adversaries’ desire for nuclear weapon capability. If this is true, the United States has shown no intention of inhibiting conventional technology and new capabilities and we must thus consider this a driving force behind nuclear proliferation. Therefore, as diplomatic, political and social consequences continue to fail and adversaries continue to desire nuclear weapons, we must focus less on a “nuclear zero” and more on “nuclear appropriate.” The United States is capable of being on the forefront of any technology and we have few military peers. What we have failed to accomplish is to think

further into the future and create strategies and deterrents for the 21st Century threats. We must not continue to spend time and effort on a 20th Century belief that we can simply abolish the nuclear weapon. We must now focus on controlling, adapting and refining our stockpile. We must establish clear and appropriate strategy and policy on how we can better prepare ourselves for a future with nuclear weapons. We must decide unequivocally what our stance and response will be to protect our freedom and the freedoms of our allies in the face of nuclear-armed adversaries. Even if we achieve nuclear zero, we must prepare a plan to counter an emerging or clandestine nuclear threat should the time come. We have been in this position before ... we answered the call ... we won the fight. Are we ignoring the 21st Century call?

Where are other covert nuclear facilities going to spring up? Is it possible to monitor the entire world? Is military kinetic response the only option to suspected nuclear proliferation facilities? What is the timeline for political negotiations in gaining access for treaty compliance inspections? What if a country is not a signatory on a treaty? Do we have the authority to demand an inspection? Is it safe to reduce the role of nuclear weapons in our national security strategy based on the pursuits of our adversaries? How do we continue to support and defend our allies with a strong nuclear deterrent? Without the ability to design new weapons and the option of underground testing, at what point does our nation's nuclear stockpile reach a point where we can no longer sustain a strong nuclear deterrent and the associated support infrastructure in a safe, secure and effective manner? Will we ignore historical successes as we once again fight an enemy who has the will to fight, does not fear death and does not abide by the normally accepted rules of war? There are an infinite number of questions regarding the proliferation of nuclear technology and materials and the ability of an international organization to effectively control both the compliant and the non-compliant actors around the world.

Chapter 7

Conclusion

Military history shows that the distinction between “acceptable” and “unacceptable” weapons exist solely in man’s mind, a convention like any other, not necessarily logical and probably not permanent.

- William Conrad

The anti-nuclear thought process has persisted for quite a while because we have not spent the time or found the right ways to define and promote the stabilizing benefits of a safe, strong and threat-appropriate nuclear arsenal. We do little more than acknowledge with words that our adversaries are trying to get their own nuclear weapons and have declared their hostile intents. Most of the discussion is why we can’t use them, not how we can. Because of this lack of future vision, we are slowly being self-deterred and we are failing to adapt our strategic forces to meet rapidly changing and unpredictable adversaries. As we saw at the end of WWII, the Japanese, who had been living by the code of the warrior in which surrender did not exist, realized that nuclear weapons tipped the cost/benefit ratio to the point where war was no longer a viable option. In that moment of time, peace prevailed. Nuclear weapons deterred and ended war...not forever of course...after all it is human nature to fight.

Stopping the proliferation of nuclear weapons is a worthy and noble goal and one on which we should spend much time and effort. Politics and nuclear innovation must synergize to create a stable and safe 21st Century. The option of nuclear zero may never lead to lasting world peace and stability as many would have us believe. So again I ask, is it simply more comforting to wage conventional war over and over and over and kill large numbers of people in acceptably small numbers in multiple battles over an extended number of years? How easily the world forgets the past. History has proven that wars will always exist and that they can be extremely devastating. It is unknown and unappreciated how many lives have been saved due to the

deterrent effect of nuclear weapons. Without nuclear weapons, another conventional war in Europe was inevitable and the consequences would have been severe. If we continue with a nuclear zero mindset, we must proceed with great reservation and plan for effective defense of freedom at all costs.

In the future, if nuclear weapons can deter even a few more conflicts or bring a few more opposing forces to the negotiation table then that should be considered a success and we should consider ourselves lucky that we continue to live in a world that is safer than previous generations. The simple fact that nuclear weapons are so powerful that nobody wants to use them is exactly what makes nuclear weapons safer than any conventional weapon. We must allow ourselves to design nuclear weapons for each specific 21st Century threat and when we have the correct capabilities, right-size the arsenal. Remember, nuclear weapons have been designed, employed and proven to deter war whereas conventional weapons are designed, employed and proven to fight a war. I prefer deterrence.

Endnotes

-
- ¹ President Barack Obama, "Remarks by President Barack Obama, Prague" (speech, Prague, Czech Republic, 5 April 2009), White House Office of the Press Secretary.
- ² Ibid.
- ³ eHistory contributors, "The Hundred Years War: Battles and Rulers," eHistory@The Ohio State University, <http://ehistory.osu.edu/osu/archive/hundredyearswar2.cfm> (accessed March 6, 2012).
- ⁴ Ibid.
- ⁵ Richard A Gabriel and Karen S. Metz, "A Short History of War, The Evolution of Warfare and Weapons," *Professional Readings in Military Strategy*, No. 5 (June 30, 1992), Chapter 5, <http://www.au.af.mil/au/awc/awcgate/gabrmetz/gabr0001.htm> (accessed March 6, 2012).
- ⁶ Ibid.
- ⁷ Ibid.
- ⁸ Ibid.
- ⁹ Ibid.
- ¹⁰ Ibid.
- ¹¹ Sven Tagil, "Alfred Nobel's Thoughts about War and Peace," Nobelprize.org, first published 23 Nov 2011, http://www.nobelprize.org/alfred_nobel/biographical/articles/tagil/ (accessed March 6, 2012).
- ¹² Ibid.
- ¹³ Richard A Gabriel and Karen S. Metz, "A Short History of War, The Evolution of Warfare and Weapons," *Professional Readings in Military Strategy*, No. 5 (June 30, 1992), <http://www.au.af.mil/au/awc/awcgate/gabrmetz/gabr0001.htm> (accessed March 6, 2012)
- ¹⁴ Ibid.
- ¹⁵ Ibid.
- ¹⁶ Ibid.
- ¹⁷ Ibid.
- ¹⁸ European Union, "Basic Information on the European Union," http://europa.eu/about-eu/basic-information/index_en.htm (accessed March 6, 2012).
- ¹⁹ History.com, "World War I," <http://www.history.com/topics/world-war-i> (accessed March 6, 2012).
- ²⁰ History.com, "World War II," <http://www.history.com/topics/world-war-ii> (accessed March 6, 2012).
- ²¹ Ibid.
- ²² BBC News, "India-Pakistan: Troubled relations," http://news.bbc.co.uk/1/hi/english/static/in_depth/south_asia/2002/india_pakistan/timeline/default.stm (accessed March 6, 2012).
- ²³ Department of Defense Directive 3150.2, "DoD Nuclear Weapon System Safety Program," December 23, 1996.
- ²⁴ Samuel Glasstone and Philip J. Dolan, comp., *The Effects of Nuclear Weapons*, 3rd ed. DoD and DoE, 1977.
- ²⁵ United States Department of Defense, *Nuclear Posture Review Report*, April 2010.
- ²⁶ Office of the Secretary of Defense for Acquisition, Technology, and Logistics, *Report of the Defense Science Board Task Force on Nuclear Capabilities*, (Washington, D.C., December 2006).
- ²⁷ George Perkovich and James M. Acton, *Abolishing Nuclear Weapons*, Carnegie Endowment for International Peace, 2009, 17, <http://carnegieendowment.org/2009/02/13/abolishing-nuclear-weapons-debate/4b0j> (accessed January 4, 2012).
- ²⁸ Ibid.
- ²⁹ Ibid.
- ³⁰ World Health Organization, *Global status report on road safety: time for action*, Geneva, 2009, www.who.int/violence_injury_prevention/road_safety_status/2009 (accessed March 6, 2012).
- ³¹ United States Department of Defense, *Nuclear Posture Review Report*, April 2010, 7.
- ³² Office of the Secretary of Defense for Acquisition, Technology, and Logistics, *Report of the Defense Science Board Task Force on Nuclear Capabilities*, (Washington, D.C., December 2006), 11.
- ³³ Ibid., 15.

-
- ³⁴ Justin Fishel, "Panetta concerned Israel months from striking Iran," *Foxnews.com*, <http://www.foxnews.com/politics/2012/02/02/panetta-concerned-israel-months-from-striking-iran/> (Accessed March 5, 2012).
- ³⁵ Charles M. Westenhoff, *Military Airpower: A revised digest* (Maxwell AFB, AL: Air University Press, 2007), 235.
- ³⁶ Charles R. Loeber, *Building the Bombs*, second edition, (Albuquerque, New Mexico: Sandia National Laboratories, 2005), 35.
- ³⁷ *Ibid.*, 35-38.
- ³⁸ President Barack Obama, "Remarks by President Barack Obama, Prague" (speech, Prague, Czech Republic, 5 April 2009), White House Office of the Press Secretary.
- ³⁹ George Perkovich and James M. Acton, *Abolishing Nuclear Weapons*, Carnegie Endowment for International Peace, 2009, 17, <http://carnegieendowment.org/2009/02/13/abolishing-nuclear-weapons-debate/4b0j> (accessed January 4, 2012), 129.
- ⁴⁰ *Ibid.*, 129.
- ⁴¹ *Ibid.*, 130.
- ⁴² *Ibid.*, 130.
- ⁴³ *Ibid.*, 130.
- ⁴⁴ Ivo Daalder and Jan Lodol, "The Logic of Zero," *Foreign Affairs*, Volume 87 No 6, November/December 2008, 81-82.
- ⁴⁵ President Barack Obama, "Remarks by President Barack Obama, Prague" (speech, Prague, Czech Republic, 5 April 2009), White House Office of the Press Secretary.
- ⁴⁶ *Ibid.*
- ⁴⁷ Sun Tzu, *The Art of War*, (Lexington, KY: Filiquarian Publishing, LLC, 2011), 9.
- ⁴⁸ Leonard S. Spector and Avner Cohen, "Israel's Airstrike on Syria's Reactor: Implications for the Nonproliferation Regime," *Arms Control Association*, July/August 2008, http://www.armscontrol.org/act/2008_07-08/SpectorCohen (accessed February 1, 2012).
- ⁴⁹ Allison, Graham and Olli Heinonen, "Break the Silence on Syria's Nuclear Program," *Wall Street Journal*, December 6, 2010, http://belfercenter.ksg.harvard.edu/publication/20584/break_the_silence_on_syrias_nuclear_program.html (accessed February 1, 2012).
- ⁵⁰ Foxnews.com, "Report: Israel considering military strike on Iran nukes," http://video.foxnews.com/v/1431992766001/report-israel-considering-military-strike-on-iran-nukes/?playlist_id=86857 (accessed February 5, 2012).
- ⁵¹ Office of the Secretary of Defense for Acquisition, Technology, and Logistics, *Report of the Defense Science Board Task Force on Nuclear Capabilities*, (Washington, D.C., December 2006).
- ⁵² President Barack Obama, "Remarks by President Barack Obama, Prague" (speech, Prague, Czech Republic, 5 April 2009), White House Office of the Press Secretary.
- ⁵³ *Ibid.*